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(54) **METHOD AND SYSTEM IN A PACKET SWITCHING NETWORK FOR DYNAMICALLY SHARING THE BANDWIDTH OF A VIRTUAL PATH CONNECTION AMONG DIFFERENT TYPES OF CONNECTIONS**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,978,357 A * 11/1999 Charny 370/231
6,301,267 B1 * 10/2001 Ben-Ami 370/468
6,304,549 B1 * 10/2001 Srinivasan et al. 370/230
6,389,031 B1 * 5/2002 Chao et al. 370/412

6,400,681 B1 * 6/2002 Bertin et al. 370/218
6,400,687 B1 * 6/2002 Davison et al. 370/236

* cited by examiner

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(57) **ABSTRACT**

The present invention relates to a method and system of sharing among a plurality of virtual channel connections the bandwidth of a bandwidth adjustable virtual path connection established between a source node and a destination node within a packet or cell switching network comprising a plurality of nodes interconnected with transmission links, said virtual channel connections comprising bandwidth adjustable reserved virtual channel connections with minimum bandwidth reservation and/or reserved virtual channel connections and/or non reserved virtual channel connections with minimum bandwidth reservation or/and totally non reserved connections without minimum bandwidth reservation. When the source node receives a notification indicating a new bandwidth to allocate to the bandwidth adjustable virtual path connection, and when this new bandwidth is lower than the sum of the current reserved bandwidth of virtual channel connections, the current reserved bandwidth of each bandwidth adjustable virtual channel connection is reduced by applying a ratio to the part of the current bandwidth reserved above the minimum reservation. The ratio is, in a preferred embodiment, proportional to the difference between the sum of the reserved bandwidth of all virtual channel connections and the new available bandwidth allocated to the bandwidth adjustable virtual path connection, and inversely proportional to the sum of the bandwidth reserved above the minimum reservation for the bandwidth adjustable virtual channel connections.

10 Claims, 19 Drawing Sheets

